

Taxonomic reconsideration and description of the male of *Macrobrachium faustinum lucifugum* Holthuis (Crustacea: Decapoda: Palaemonidae)

Reconsideración taxonómica y descripción del macho de *Macrobrachium faustinum lucifugum* Holthuis (Crustacea: Decapoda: Palaemonidae)

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Abstract

The male of *Macrobrachium faustinum lucifugum* Holthuis is described and raised to the species level. The differences between *M. lucifugum* and *M. faustinum* are discussed. Geographical and ecological information is also given.

Resumen

Se describe el macho adulto del Palemónido *Macrobrachium faustinum lucifugum* y se eleva éste a la categoría de especie. Se discuten las principales diferencias entre *M. lucifugum* y *M. faustinum*

Key Word: Crustacea, Decapoda, Subterranean shrimps, Systematic, Cuba

Palabras Clave: Crustacea, Decapoda, Camarón troglobio, Sistemática, Cuba.

INTRODUCTION

The subspecies *Macrobrachium faustinum lucifugum* was described by Holthuis (1974) based on an adult female, collected by L. Botosaneanu in "Cueva del Agua de Yara", Guantanamo province, during the second Cuban-Rumanian joint expedition in 1973. This subspecies had been previously studied by various authors (SCHMITT, 1936; CHACE AND HOLTHUIS, 1948; HOLTHUIS, 1952), who identified it provisionally as *M. faustinum*, with only some differences with respect to the typical form. Nevertheless, none of the above mentioned authors had adult specimens available at that moment nor a sufficiently large sample to justify the establishment of a new taxon. The objectives of the present work are to describe the adult male of *Macrobrachium f. lucifugum*, collected in the "Casimba El Brinco", Playa Giron; to explain its taxonomic status and to propose raising this taxon to the category of species.

In Cuba, the genus *Macrobrachium* is represented by six species: *M. acanthurus* (Wiegmann); *M. carcinus* (Linnaeus); *M. crenulatum* Holthuis; *M. heterochirus* (Wiegmann); *M. faustinum* (De Saussure) and *M. lucifugum* Holthuis (GOMEZ, JUARRERO AND ABIO, 1989; RODRIGUEZ, JUARRERO AND ESTRADA, 1993; JUARRERO AND GOMEZ, 1995).

MATERIAL AND METHODS.

The measures were taken in millimeters. The length of the specimens corresponds to the length of the carapace (LC), that is, the distance from the subsequent margin of the ocular orbit to the edge of the carapace. The material is deposited in the carcinological collections of the Havana Ecology and Systematic Institute.

SYSTEMATIC

CLASE CRUSTACEA

ORDER Decapoda

Macrobrachium lucifugum Holthuis, new status
(Figs. 1-2)

Macrobrachium olfersii p.p. Rathbun, 1919: 324.

Macrobrachium olfersii Hummelinck, 1933: 319; SCHMITT, 1936: 372.

Macrobrachium sp. (near *M. faustinum*) Chace and Holthuis, 1948: 23; NICHOLAS, 1986: 138.

Macrobrachium faustinum lucifugum Holthuis, 1974: 238; HOBBS, JR., HOBBS, H. AND DANIEL, 1977: 150; JUARRERO AND DUARTE, 1989: 3; GOMEZ, JUARRERO AND ABIO, 1990: 6.

Material examined.

A male (allotype). Casimba El Brinco, Playa Giron, Matanzas province, January 10, 1993, A. León (20-40 cm of depth on sediment).

Description of the male (Allotype).

The rostrum is prolonged, slightly upcurved and it extends beyond the end of the antennal scale, armed with 12 dorsal teeth, six of which are located behind level of orbital margin, the remaining six are larger and are found more spaced toward the top, this one exhibits three subapicals small teeth; the ventral margin carries five teeth that are situated in concave half. Stylocerite reaches to little less than half of the basal segment of the antennular peduncle bearing a strong tooth in the anterolateral margin (in dorsal view), and finally stretched almost up to the second segment of the peduncle. Lengthened scaphocerite, surpassing the antennular peduncle, is three times longer than wide; the external margin is straight, slightly arched outward, and ends in a strong tooth, sharpened, that surpasses slightly the truncated apex of the lamella. The antennal peduncle reaches the first subsequent third of the scaphocerite, which has a prominent spine at its basis. Carapace with a smooth surface, and strong antennal spine located below the orbital margin; conspicuous hepatic spine, as developed as the previous one, located little more downwards and behind the antennal one. The mouth parts are similar to *M. faustinum*. Mandible with a palp separated by three segments; the incisor process has three developed teeth the first of which being the most remarkable; the molar process ends in a group of blunt teeth. The maxillipeds exhibit well developed exopodits; the first maxiliped has two endits separated

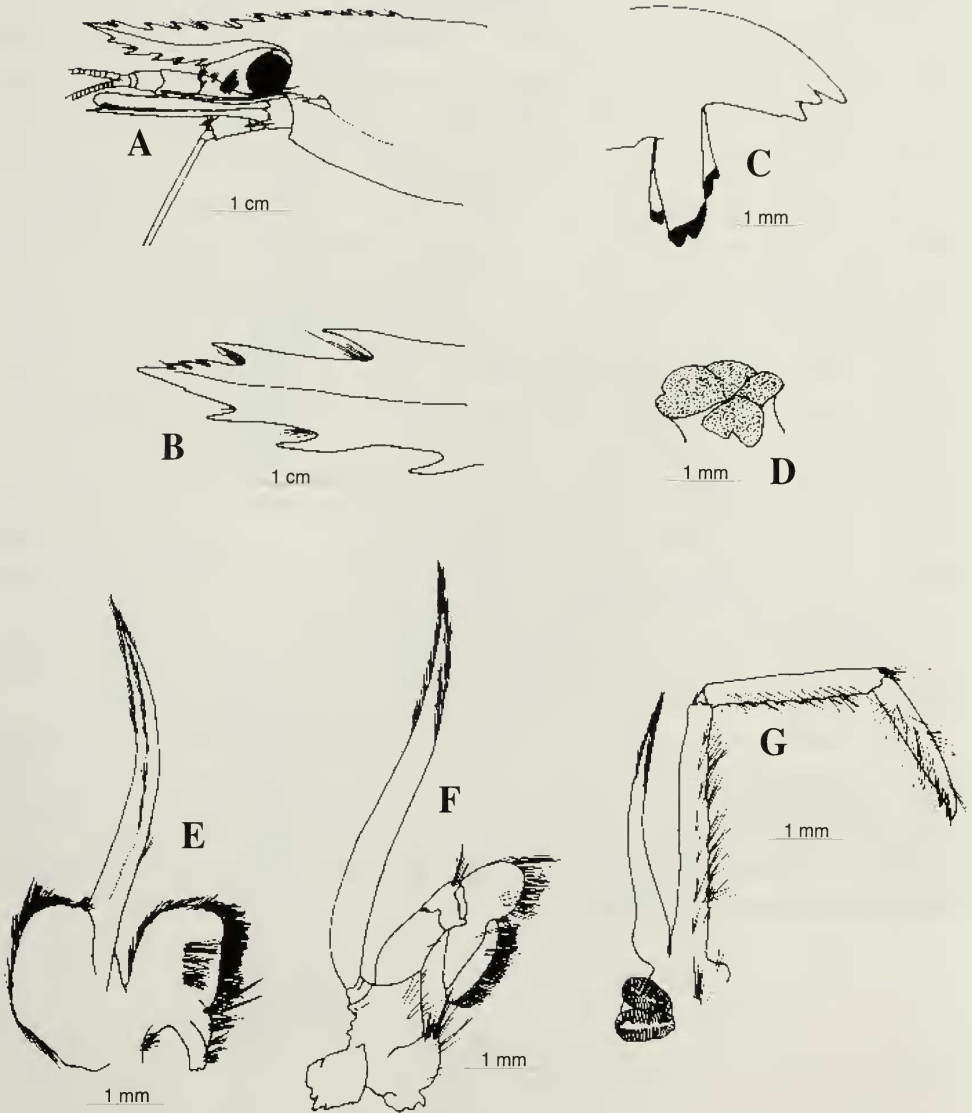


Figura 1 *Macrobrachium lucifugum*. A, carapace (lateral view); B, extreme distal of the spine rostral (lateral view); C, Mandible; D, detalle del proceso molar (ventral view); E, primer maxiliped; F, segundo maxiliped; G, tercer maxiliped.

Figure 1 *Macrobrachium lucifugum*. A, cefalotorax (vista lateral); B, extremo distal de la espina rostral (vista lateral); C, mandíbula; D, detalle del proceso molar (vista ventral); E, primer maxilipedo; F, segundo maxilipedo; G, tercer maxilipedo.

by a notch, the palp presents the distal part narrow and the epipod is bilobed ; the second maxiliped has a large podobranch; the third maxiliped reaches the distal extreme of the antennular peduncle, the last segment is shorter than the second one which, in turn, is shorter than the third. The first pair of pereopods surpasses the antennal scale with the first half of the propod; fingers slightly smaller than the propod, carpus longer than the merus and four times the length of the palm. Second pair of pereopods unequal in length and width; of them, the largest extends with half of the carpus to the apex of the scaphocerite and is covered with tiny spines and hair more abundant (without forming a real plume) at the end of the propod and beginning of the dactylus; the fixed finger has four small teeth in the basal part of the internal margin or sharp edge, and one of larger size, conical, located at the end of the first third; the movable finger has three small denticles a little more spaced than that of the fixed finger and one a little larger than the others; the carpus is subcilindric, twice narrow in its anterior part; the palm is almost 1,5 times the length of the fingers and slightly larger than the carpus; the merus is similar in length to the dactylus. Third pereopod that surpasses the scaphocerite with part of the propodus and has, in the subsequent margin of the propodus, a uniform row of 10 spines, with two a little larger in its extreme distal; the propod is 1,7 times longer than the carpus and slightly smaller than the merus. Fourth pereopod much like the third, with a row of 14 spines all along the subsequent margin of the propod and two spines and a panache of spiniform bristles in the distal extreme. Fifth pereopod thinner than the others, surpassing the scaphocerite with part of the propod; the propodus is 4,5 times the size of the dactylus and almost equal in length to the merus, with a row of seven small spines all along the internal margin and panache of spiniform bristles and marginal and submarginal hair in its distal extreme; the carpus, subcilindric, is almost three times the length of the dactylus.

The abdomen has the pleura of the first to the fourth somite rounded; the pleura of the fifth somite ends in a small sharpened tooth and the posterolateral angle of the pleura of the sixth somite ends in a small sharpened tooth, a little larger than the previous one. Second plepod with the internal appendix that extends to the last third of the masculine appendix, with numerous small spiniform bristles in the distal end. Length of the carapace without the rostral spine: 19,2 mm.

Pereipods						
Segments	1	2 left	2 right	3	4	5
Merus	7,2	7,5	10,7	9,1	9,2	9,2
Carpus	8,6	11,0	13,5	5,3	5,3	6,5
Propodus	2,6	9,5	14,2	8,2	8,1	9,6
Dactylus	2,0	8,0	10,0	2,1	2,0	2,2

Table I Dimensions of the segments of the five pereipods of the allotype male *M. lucifugum*
Tabla I Dimensiones de los segmentos de los cinco pereipódodos del macho alótípo de *M. lucifugum*

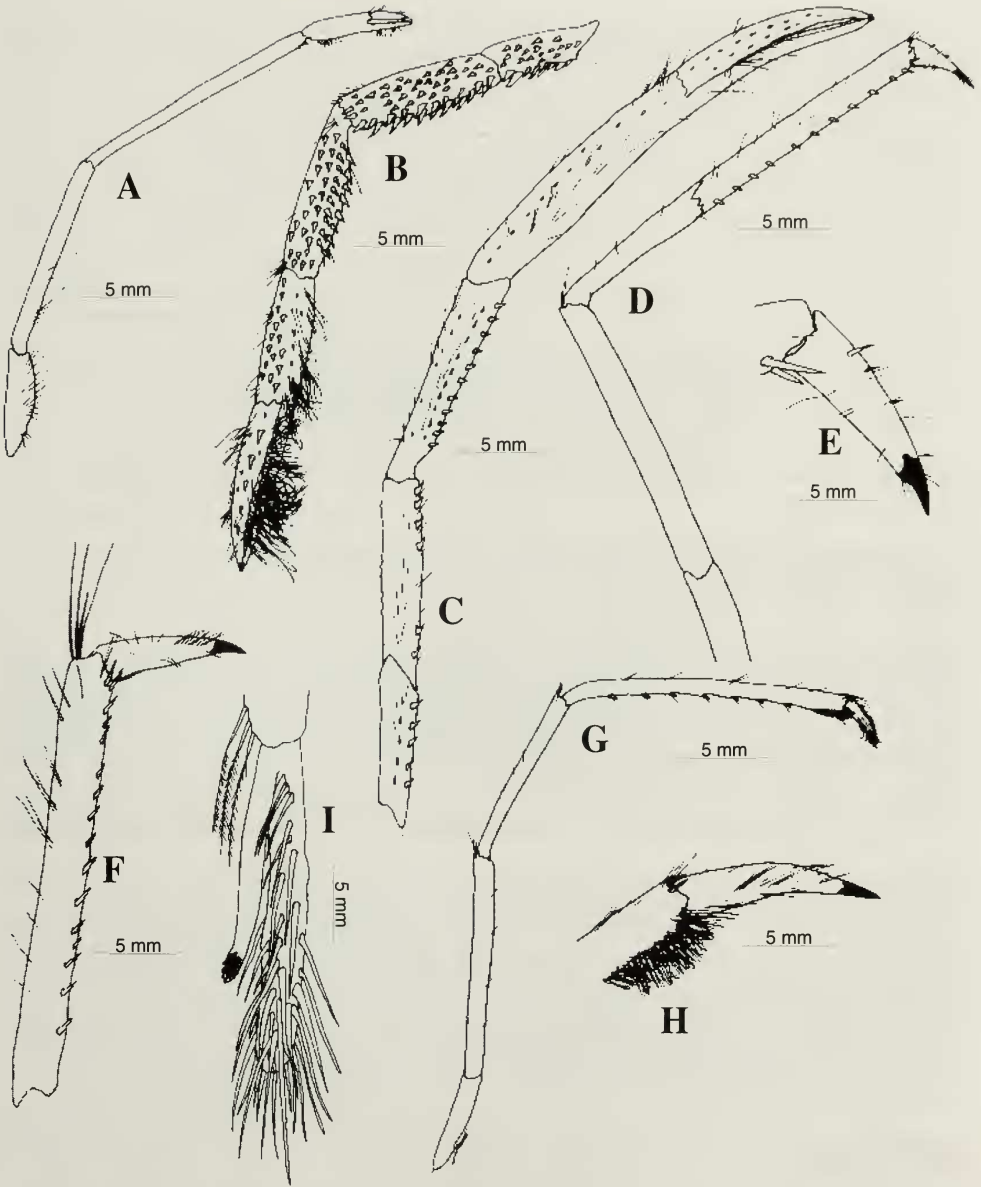


Figura 2 *Macrobrachium lucifugum*. A, first pereopod (second major pereopod of the male); B, *M. faustinum* (Rio Sigua, LC = 7,4 mm); C, *M. lucifugum*; D, third pereopod; E, detail of the dactylus of the third pereopod; F, propod and dactylus of the fourth pereopod; G, fifth pereopod; H, partial detail of the propod and dactylus; I, second pleopod of the male.

Figure 2 *Macrobrachium lucifugum*. A, primer pereiópodo (segundo pereiópodo mayor del macho); B, *M. faustinum* (Río Sigua, LC = 7,4 mm); C, *M. lucifugum*; D, tercer pereiópodo; E, detalle del dactilo del tercer pereiópodo; F, propodo y dactilo del cuarto pereiópodo; G, quinto pereiópodo; H, detalle parcial del propodo y dactilo; I, segundo pleópodo del macho.



Figure 3. Distribution of *Macrobrachium lucifugum*
Figura 3. Distribución de *Macrobrachium lucifugum*

Locality type. Cave of the “Agua de Yara”, Baracoa, Guantanamo Province, Cuba (HOLTHUIS, 1974).

Geographical extension. West Indies (Cuba, Jamaica, Dominican Republic, Puerto Rico, Curaçao).

Distribution. Pinar del Rio province: Del Palmero Cave, not far from highway between Quemado Pineda and Santo Tomas-Moncada. Matanzas province: Lago del Fango, Lago de los Peces Ciegos, in La Pluma Cave; Casimba Iona; Casimba Dagmar; Casimba el Brinco; Casimba Cuba Checoslovaquia; Casimba XXX Anniversario, located by the highway that connects Playa Larga to Playa Giron. Holguin province: Panaderos Cave; Marine Cave, Caletones Beach, Gibara. Guantanamo province: Agua de Yara Cave, Baracoa.

Natural history. Except in Del Palmero and la Pluma caves, which are caverns with completely fresh waters, *Macrobrachium lucifugum* has been collected in numerous crevices and brackish water pools, always above the interface, in lit and superficial zones where the salinity is lower (about 14%). In the case of the material collected by Botosaneanu in 1973, during the cuban-rumanian expedition, the locality (Cueva del Agua de Yara) was characterized by presenting obscure zones and salinity somewhat high (HOLTHUIS, 1974).

DISCUSSION

HOLTHUIS (1974) considered to *Macrobrachium f. lucifugum* as an ecological subspecies of *M. faustinum*, in the first place, because its subterranean habitat (mainly of brackish water), and in the second place, for the lack of an adult male in his sample, that would allow him to corroborate the status of subspecies or to establish a superior category. Although we consider that *M. lucifugum* is a species that invaded the troglotic habitat recently—because it has not modified entirely the structures that permit a better adaptation to the cavernicolous life (strong or total reduction of the pigmentation, reduction of

the eyes, reduction of the size and stretching of the appendices, etc.)— this taxon has been enough differentiated from *M. faustinum*, as to suggest *M. lucifugum*'s legitimacy as a good species. Both taxons differ in the following characters: 1) shape and size of the rostral spine; 2) number and disposition of the teeth in the dorsal margin of the rostral spine; 3) presence of small subapical teeth in the apex of the rostrum of *M. lucifugum*; 4) pereopods somewhat thinner and longer in *M. lucifugum*; 5) strong spination in the second pereopod of, specially in the ischium, merus and carpus; in the case of *M. lucifugum* this spination is weak and scarce; 6) inverse proportion between the length of the chelas and the palm in the second larger pereopod of the male in both species (*M. faustinum* has the fingers slightly longer than the palm and *M. lucifugum* has the palm almost 1,5 times longer than the fingers); 7) absence of a thick panache of strong hair in the chelas of the second pair of pereopods of *M. lucifugum* (in the case of, the internal margin of the fingers is covered with a dense pubescence); 8) masculine appendix of the second pleopod of the *M. lucifugum* male with smaller density of spiniform bristles.

ACKNOWLEDGEMENTS

I would like to express my deep gratitude to Abel Pérez and Alejandro León for the collection of the specimens described in this work. I am very much indebted to Dr. Jill Yager, at the University Antioch, Ohio, U.S., for the specimens of *M. lucifugum*, collected in several brackish pools of Playa Giron and placed at my disposal. Finally, my gratitude to Dr. Osvaldo Gómez Hernández at the Sea Investigations Center, to Dr. Luis F. de Armas at the Ecology and Systematics Institute and to Dr. José Espinosa at the Oceanology Institute, for the critical review of the manuscript and their invaluable recommendations.

REFERENCES

- CHACE, F. A., Y HOLTHUIS, L. B. 1948. Land and fresh water decapod Crustacea from the Leeward group and northern South America. *Stud. Fauna Curazao, Aruba, Bonaire, Venezuelan Islands*, 3 pt., 12:21-28.
- GOMEZ, O.; JUARRERO, A. Y ABIO, G. 1990. Catálogo y bibliografía de los camarones (Crustacea: Decapoda) cubanos de agua dulce. *Poeyana*, 397:1-11.
- HOBBS, H. JR., HOBBS H., H. Y DANIEL, M. 1977: A review of the troglobitic Decapod Crustaceans of the Americas. *Smithsonian Contrib. Zool.*, 244:1-185.
- HOLTHUIS, L. B. 1952. The subfamily Palaemoninae. A general revision of the Palaemonidae (Crustacea, Decapoda, Natantia) of the Americas. II. *Occas. Pap. Allan Hancock Found.*, 12:1-396.
- HOLTHUIS, L. B. 1974. Subterranean Crustacea Decapoda Macrura collected by Mr. L. Botosaneanu during the 1973 Cuban-Roumanian biospeological expedition to Cuba. *Inf. J. Speleol.*, 6:231-242.
- HUMMELINCK, P. W. 1933. Reisebericht. Zoologische Ergebnisse einer Reiser nach Bonaire, Curazao und Aruba im Jahre 1930. No. 1. *Zool. Jahrb. Syst.*, 46:3-4.
- JUARRERO, A. Y DUARTE, R. 1989. Adiciones a la fauna de Camarones dulciacuícolas (Crustacea: Decapoda) de la provincia de Guantánamo, Cuba. *Misc. Zool.* 46: 3-4.
- JUARRERO, A. Y GOMEZ, O. 1995. *Sinopsis de los camarones dulciacuícolas (Crustacea: Decapoda) de Cuba*. Editorial Academia, La Habana. 48 pp.
- RATHBUN, M. J. 1919. *Sialic-eyed crustaceans of the Dutch West Indies*. En J. Boeke Rapport betreffende een voorloopig onderzoek naar den toestand van de visscherij en de industrie van zeeproducten in the Kolonie Curazao, 2:317-348 [citado por Chace y Holthuis, 1948].
- RODRIGUEZ, G.; JUARRERO, A. Y ESTRADA, R. 1992. *Macrobrachium crenulatum Holthuis (Crustacea: Decapoda: Palaemonidae) nuevo registro para Cuba*. En Comunicaciones breves de Zoología, Editorial Academia, La Habana, pp. 11-12.
- SCHMITT, W. L. 1936. Macruran and Anomuran Crustacea from Bonaire, Curazao and Aruba. *Zoologische Ergebnisse einer Reise nach Bonaire, Curazao und Aruba in Jahre 1930*. No. 16. *Zool. Jahrb. Syst.*, 67:363-378.